by the other. The calculation of deflections by "Mohr's method" is good. But the whole subject would have been much clearer if the well-known principle had been explained, that the load, shearing force, bending moment, slope and deflection curves form a series each derived from the next by graphic integration.

The phrasing is often loose. "For most metals . . . the yield point is reached when there is a sudden large increase in strain." Only in a few metals is there a yield point in this sense. The whole account of fatigue is unsatisfactory. The author is in confusion between the old view of Claxton Fidler, who must always be spoken of with respect, who believed that the Wöhler effect was purely the result of dynamic action, and what is now clear that there is a real "fatigue" due to slip fissures developing at first slowly, but at last rapidly and locally. It is true that American engineers have mixed up an allowance for fatigue and for impact in the case of railway bridges. But that is wrong in principle. Strictly, the fatigue allowance is not one of the factors which make up the factor of safety, but like the yield point, the fatigue limit is a stress not to be exceeded when the total stress due to load, impact, and contingencies has been calculated. To the author "the subject is still full of difficulties" (p. 89). At this late date it is odd to read "we will make the following assumptions in developing *our* theory of torsion" (p. 317). The use of alignment charts in designing springs seems new (p. 342).

PLANTS OF FORMOSA AND THE RIVIERA.

(1) *Icones Plantarum Formosanarum nec non et Contributiones ad Floram Formosanam.* Vol. iv. By B. Hayata. Pp. vi+264+xxv plates. (Taihoku: Government of Formosa, 1914.) n.p.

(2) *Flowering Plants of the Riviera.* By H. Stuart Thompson. With an Introduction on Riviera Vegetation. By A. G. Tansley. Pp. xxix+249. (London: Longmans, Green, and Co., 1914.) Price 10*s.* 6*d.* net.

(1) THE fourth volume of Dr. Hayata's great work on the flora of Formosa, modestly described as "materials for a flora of the island," based on a study of the collections of the Botanical Survey of the Government of Formosa, contains descriptions of 285 species, of which no fewer than 167 are new to science, including a new orchid genus Arisanorchis of considerable interest as adding another member to the small list of leafless saprophytes in this family. Moreover, thirteen genera are mentioned as new to the Formosan flora, these including such well-known genera as Aconitum, Cornus, and Hydrocharis. This volume brings the total number of species of the flora up to more than 3000, and we are promised several more volumes, indicating the remarkable floristic richness of the island.

In his interesting introduction the author suggests two resolutions regarding the description of new species of plants for consideration at the meeting of the International Botanical Congress fixed for the summer of 1915 in London, "if the present overwhelming war is then over." This introduction is dated August 31, 1914. As usual in Dr. Hayata's works, the illustrations are numerous and beautifully executed, and the whole reflects the greatest credit upon the author and upon the enlightened Government of Japan. It is worthy of note that the author has preferred to follow the classification of Bentham and Hooker rather than that of Engler and Prantl, and this appears a wise choice, for although the former system may be in various respects inferior as a method of presenting the genetic affinities of the families of plants, the latter is far from being a natural system, and is constantly undergoing modification. This being the case, adherence to the older system, for purposes of ready comparison between different floras, is perhaps on the whole the best course to adopt.

(2) The author's previous volumes on alpine and subalpine plants fully demonstrated his facility for popular yet accurate plant description, and he has had long personal acquaintance with the region here dealt with. The flora is arranged on the Bentham and Hooker system, thus facilitating comparison with French works on the flora of the Riviera, in which the system used is practically identical with the English one. The author has spared no pains to make it easy for those with even a slight knowledge of botanical terminology to identify the plants described, for the actual descriptive part is preceded by synopses of family characters and keys to the tribes and genera, and there is also a full and clear glossary of terms used. As the subtitle ("A Descriptive Account of 1800 of the More Interesting Species") indicates, the book does not profess to be an exhaustive "flora," but though the botanist may regret the incompleteness which is particularly noticeable in the case of some of the larger families and genera, these cases nearly all refer to groups which the non-professional botanist would find unattractive. The author wisely refrains from the attempt, which mars many books of this scope, to manufacture so-called English names for species.

The plates, both coloured and plain, are exceedingly good, and a valuable feature of the book is the interesting but disappointingly brief introduction by Mr. Tansley, which deals with the ecology

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of the Mediterranean vegetation and the various plant communities represented in the Riviera. However, brief as it is, this introduction gives a remarkably clear picture of the vegetation, such points as the relations of soils and the striking effects of exposure and shelter being well brought out. Those who hope to visit or revisit this beautiful region, when happier times arrive, should have Mr. Thompson's book on Riviera flowering plants.

TWO HANDBOOKS OF EXPLORATION.

(1) *Stories of Exploration and Discovery.* By A. B. Archer. Pp. x + 198. (Cambridge: At the University Press, 1915.) Price 2*s.* 6*d.* net.

(2) *The North-West and North-East Passages, 1576–1611.* Edited by P. F. Alexander. Pp. xx + 211. (Cambridge: At the University Press, 1915.) Price 2*s.* 6*d.* net.

(1) MR. ARCHER'S book supplies a short history of exploration in simple language. It opens perhaps a little uncertainly on the importance of the Eastern Mediterranean as the earliest known centre from which knowledge of the world was extended outwards. "The Egyptians used boats on the Nile, and perhaps along the coasts of their country, but probably the first serious navigators were the people of Phœnicia"—this, in the light of recent research concerning early Mediterranean peoples, is not a wholly satisfactory summary. The subsequent chapters are handled more firmly, and the rather difficult task of balancing between topographical correlation and historical sequence is judiciously carried out. The final chapters on modern polar exploration, however, are less successful. They maintain the interest to the student, but sometimes a point is missed: thus, it is an unfortunate version of the dramatic encounter between Nansen and Jackson which states that Nansen and Johansen "reached the south of Franz Joseph Land, where to their delight a relief ship was waiting." There is a short bibliography of easily-accessible books of reference, and a good index is provided. There are also some rough but sufficiently clear maps, and some clever adaptations of old maps.

(2) Mr. Alexander's book contains a series of extracts from original narratives of voyages in search of the north-west and north-east passages, together with an explanatory introduction, a chronology of important dates in geographical discovery generally, and notes. The extracts are from George Best's account of Frobisher's first and second voyages, from the narratives of Davis's three voyages and of Hudson's last voyage, and from de Veer's account of Barents's third voyage; which is supplemented by an account of the discovery, in modern times, of relics of that voyage. Hakluyt, Purchas, and the Hakluyt Society's second edition of Phillip's translation of de Veer have been drawn upon. The modernising of these texts, so far as necessary, has been carried out without any of the charm of the original being lost. It is this peculiar charm which makes these narratives most attractive to the student for whom these volumes are designed—for it should be added that this book belongs to a series to be known as "Cambridge Travel Books," of which another, "The Earliest Voyages Round the World," is stated to be in the press. The book is excellently produced, and the original illustrations reproduced are as instructive as they are amusing; there are also a few explanatory maps. It can only be a question whether in a book of this compass, designed for the purposes indicated, there should not be shorter extracts from more narratives, but no doubt it would be difficult, if not impossible, to carry out such a plan and maintain the interest of the originals.

OUR BOOKSHELF.

Aids to the Analysis and Assay of Ores, Metals, Fuels, etc. By J. J. Morgan. 2nd edition. Pp. viii + 138. (London: Baillière, Tindall and Cox, 1915.) Price, cloth, 3*s.* net; paper, 2*s.* 6*d.* net.

THE first edition of this capital little book has been useful to students of evening classes for a number of years, and the appearance of the second edition will be welcome to their instructors in metallurgical analysis. The general arrangement is good, and has been maintained unchanged, but the book has been considerably enlarged. In addition to descriptions of the assay of the ores of the common metals and of the complete analysis of commercially impure metals, sections are devoted to special steels and other alloys, fuels, furnace materials, and slags. There is also some account of the analysis of the by-products of coke-ovens. The characteristic of the book is that as a rule only one method of determination is given in each case, but the methods are well chosen as having stood the test of time, and the descriptions are concise and accurate. Little is said about apparatus and reagents; there are few illustrations, and in general the book seems to be intended rather to remind students of what they have been taught than to take the place of laboratory demonstration. In cases where the more expensive standard works on analysis and assaying are inaccessible, this handy volume will be found to take their place with scarcely any disadvantage. It is small enough to slip into the pocket.

Alignment Charts: their Principle and Application to Engineering Formulae. By E. S. Andrews. Pp. 32. (London: Published for James Selwyn and Co. by Chapman and Hall, Ltd.) 1*s.* 3*d.* net.

ALIGNMENT charts have been used to some extent by engineers in recent years, and are capable of being employed to a much greater extent. The

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